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CABLE BILLING SYSTEMS AND METHODS ENABLING INDEPENDENCE OF SERVICE MARKETING AND PROVISIONING FROM BILLING AND COLLECTION OF REVENUE

RELATED APPLICATION DATA

15   The present application claims priority from U.S. Provisional Patent Application

No, 60/263,176, titled "Service Offering Price Computation", filed on January 22, 2001,

the entire contents of which are incorporated by reference herein.

FIELD OF THE INVENTION

20   This invention relates in general to the field of cable systems, and more

particularly, to billing for services in digital cable systems.

BACKGROUND OF THE INVENTION

        Historically, television services have been comprised of analog broadcast audio

25   and video signals. Cable television systems now receive broadcasts and retransmit them

with other programming to users over land-line networks, typically comprising fiber optic

cable and coaxial cable. With the recent advent of digital transmission technology, cable

television systems are now capable of providing much more than the traditional analog

broadcast video. For instance, two-way and advanced one-way communications between

30   a subscriber and a cable system headend are now possible.

        In implementing enhanced programming, the home communication terminal,

otherwise known as the set-top box, has become an important computing device for

accessing video services and navigating a subscriber through a maze of available services. In addition to supporting traditional analog broadcast video functionality, digital set-top boxes now also support an increasing number of services which are digital two-way communications, such as video-on-demand, email and web-browsing. These

5 are all in addition to the host of other television services which are increasingly being demanded by consumers, examples of which include audio and audio/visual programming, advanced navigation controls, impulse pay-per-view technology, and on-line commerce.

     With the addition of interactive services, increased bandwidth and the emergence

10 of bi-directional communication capabilities available through a digital television system, there is a need to provide standard methods and systems for billing services provided by and accessed by a subscriber from service providers. Currently, billing systems are integrated into cable systems such that the billing vendors are responsible not only for billing for a service, but for provisioning the service in the system. The billing

15 component of the cable system is typically outsourced to billing vendors, which manually update customer lists each time a new customer is added by the cable system and send out bills every month. This structure has operated well for many years, as the cable industry originally had only one service offering – video. However, cable evolved to offer channels and services that required customers to need a subscription. Additionally,

20 interactive services such as PPV were created, in which a subscriber can contact the cable company and instantly request a particular movie.

     Up until recently there have not been many new services added to cable systems, and conventional billing system vendors could write new code to account for the different requirements of each service. These requirements included not only executing billing for

25 a service, but in fulfilling the service because the billing system must send a message to the network controller indicating that a service should be provided to a subscriber who has been authorized. Therefore, if a subscriber called up the cable company and requested a PPV movie, a customer service representative would be operating a terminal running software provided by the billing vendor that tells the network controller to

30 authorize the STB to play the movie. The billing vendor would then make a record of that purchase.

Now, with interactive services such as AOL TV, service providers have to go to billing vendors each time a new service is rolled out, which is inefficient due to the expense and time required to modify billing software. Typically a year or more is required for a billing vendor to implement a new service. Therefore, what is needed is a

5 billing system that is not involved in the fulfillment of a service while retaining all of the necessary billing and authorization functions of a conventional billing system.

SUMMARY OF THE INVENTION

The present invention provides for a billing system that allows a billing entity to
10 authorize and bill subscribers without requiring that the billing system be included in the fulfillment of service.

According to one embodiment of the invention, there is disclosed a digital delivery system facilitating the provisioning and billing of a service offered to subscribers. The delivery system includes at least one service, where the at least one
15 service generates an offering marketed to a subscriber of the digital delivery system, and wherein the offering comprises metadata and a price algorithm. The system also includes a billing system in communication with the at least one service, where the billing system is capable of interpreting the metadata to generate a bill corresponding to the offering.

According to one aspect of the invention, the billing system maintains at least one
20 table comprising tax-related information associated with the offering. According to another aspect of the invention, the metadata includes a plurality of billing items, where the billing system identifies at least one of the billing items for inclusion in the metadata.

The digital delivery system of the present invention can also include a marketing component that provides marketing data associated with the offering to the price
25 algorithm, and a network controller in communication with the at least one service, for provisioning the offering to a set-top box. The price algorithm can compute an offering price for the offering. Additionally, the network controller may be in indirect communication with the billing system.

According to another embodiment of the invention, there is disclosed an offering
30 that facilitates the provisioning and billing of a service to a subscriber in a digital delivery system. The offering includes metadata and a price algorithm. The metadata comprises

billing related information identified by a billing system and generated by the service, where the metadata is utilized by the billing system to compute a bill for the offering. The price algorithm generates a list price for the offering, where the list price is used by the billing system to compute a bill for the offering.

5   According to one aspect of the invention, the offering corresponds to a line item on a bill generated by the billing system. Furthermore, the price algorithm can generate a list price for the offering based upon marketing data associated with the offering. According to another aspect of the invention, the marketing data is provided by a **marketing component, which may include a cable company marketing department.**

10   According to yet another embodiment of the invention, there is disclosed a method of facilitating the provisioning and billing of a service in a digital delivery system. The method includes generating an offering representing an item for purchase from a service, and forwarding metadata within the offering to a billing system such that the billing system can generate a bill for the offering based upon the metadata.

15   Generating an offering includes querying a billing system to determine billing related metadata interpretable by the billing system, and creating the offering, where the offering comprises metadata corresponding to the billing related metadata identified by the billing system.

According to one aspect of the invention, creating an offering further includes

20   creating an offering comprising a price algorithm, where the price algorithm is utilized to compute a list price for the offering. The method can also include generating a bill at the billing system for the offering based upon the metadata. Generating a bill for the offering based upon the metadata can also include accessing at least one tax related table in the billing system to determine taxes associated with the offering.   According to another

25   aspect of the invention, the method can further include provisioning the offering to a subscriber of the digital delivery system, where the provisioning is implemented by the service, rather than the billing system. Furthermore, provisioning the offering can further include determining whether the subscriber is authorized to receive the offering, wherein the determination is executed by the billing system. Additionally, provisioning the

30   offering can include instructing a network controller to distribute content associated with the offering.

Many objects, features and advantages of the present invention will become apparent to one of ordinary skill in the art upon examination of the following drawings and detailed description.

5   **BRIEF DESCRIPTION OF THE DRAWINGS**

Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

FIG. 1 is a high-level block diagram view of a Digital Distribution and Delivery System in accordance with an embodiment of the present invention.

10   FIG. 2 shows a block diagram of a conventional billing system of the prior art.

FIG. 3 shows a block diagram view of a billing system of the present invention according to one aspect of the invention.

FIG. 4 shows a block diagram view of a billing system of the present invention according to one aspect of the invention.

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DETAILED DESCRIPTION OF THE INVENTION

The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should

20   not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

FIG. 1 shows a block diagram view of a digital distribution and delivery system

25   (DDDS) **10**. Generally, the DDDS **10** is a an integrated network system that features video, audio, voice and data services transmitted to Cable television (TV) subscribers. Although FIG. 1 depicts a high level view of a DDDS **10** including a single HFC Network **35**, as will be described below, it should be appreciated that a plurality of DDDSs including multiple HFC Networks can tie together a plurality of regional

30   networks into an integrated global network so that Cable TV subscribers can receive content provided from anywhere in the world. The DDDS **10** delivers broadcast video

signals as digitally formatted signals in addition to delivering traditional broadcast analog video signals. Furthermore, the DDDS 10 can support one-way broadcast services as well as both one-way data services and two-way media and data services. The two-way operation of the network allows for user interactivity with services, such as Pay-Per-View

5 programming, Near Video-On-Demand (NVOD) programming (according to any of several known NVOD implementation methods), Video-on-Demand (VOD) programming (according to any of several known VOD implementation methods), and interactive applications, such as Internet connections and interactive services that render real-time bi-directional communication on a personalized basis such as bi-directional

10 audio-visual communication.

The DDDS 10 also provides the interfaces, network control, transport control, session control, and servers to establish on-demand session-based bi-directional communication service between a particular remote destination and a set-top box user for delivering media from the particular remote destination to the set-top box user and input

15 information from the set-top box user to the particular remote destination. A remote destination during a session of a bi-directional communication service may comprise a remote personal destination such as a friend or a remote vendor that offers a bi-directional communication service for a purchasable period of time in which a viewer communicates real-time with the vendor on a personal basis. In either case, dedicated

20 DDDS resources are allocated to fulfill individualized bi-directional communication over a purchasable period.

Referring again to FIG. 1, the DDDS 10 is composed of content/service providers 15, at least one network operations center (NOC) 20, a high speed distribution network 25, a headend 30, an HFC Network 35 and subscribers' set-top boxes 40. It should be

25 appreciated that although FIG. 1 includes a number of single components (i.e., NOC, headend, HFC network), the DDDS 10 can feature a plurality of each of the illustrated components. The content/service providers 15 represents one or more providers of content, such as video channels, music channels, data channels, video services, audio services and data services. For example, according to one aspect of the invention, a

30 content/service provider 15 could comprise a distributor of movies. According to another aspect of the invention, the content/service providers 15 could represent an Internet

Service Provider (ISP) providing data to the system to enable subscribers web access or web-enhanced video via the subscriber's television set. The content/service provider **15** transmits the content to a headend **30** via a high speed distribution network **25** for further transmission to subscribers downstream in the network. Also in communication with the headend **30** is the NOC **20**, which is an external management center interfaced with the DDDS **10** to allow for the remote operation of the system. Typically, the high speed distribution network **25** includes one or more satellite and/or fiber optic components and links for high-speed data transmission of content and/or services to the headend **30**. It should be appreciated that the high speed distribution network **25** represents hardware and software components for electrically transmitting content and/or services to the headend **30**, as opposed to physically carrying or transporting content, such as a video tape or digital video disc, from the content/service provider **15** to the headend **30**..

From the headend **30** content and/or services are communicated by a Hybrid/Fiber Coax (HFC) Network **35** to the subscriber set-top boxes **40**. The HFC Network **35** typically comprises a plurality of HFC nodes, each which may service a local geographical area. More specifically, content and/or services are provided from the content/service provider **15** via transmission through the headend **30** and HFC Network **35** downstream to one or more taps that connect to a subscriber's set-top box **40** through coaxial cable in a logical tree configuration, which is where the optical-to-electrical and electrical-to-optical conversations of the HFC network **35** take place. It will be appreciated by those of skill in the art that the system **10** may include a number of additional elements, such as Hubs, HFC nodes, taps, network interface units, RF amplifiers, and the like. However, because the general features of a DDDS is well known to those of skill in the art, further description is not contained herein.

FIG. 2 shows a block diagram of components comprising a conventional cable system **50** of the prior art. The system **50** generally includes a billing system **60**, network controller **65**, STB **70**, and subscriber **75**. The network controller **65** communicates with the HFC network **35** to allocate system resources to establish communication paths to fulfill service requests. In operation, subscriber **75** requests are transmitted to the billing system **60**, which communicates with the network controller **65** and instructs the network controller **65** to fulfill the requested service.

To bill for a particular service item (e.g., a PPV movie) requested by the subscriber, such as via the STB **70** or through a conventional telephone call, a modem or the like, the billing system **60** sends a message to the network controller **65** that instructs the controller **65** to provide the subscriber **75** the service item. This is typically done

5   only if the billing system **60** determines that the subscriber **75** is authorized to receive the requested service item. This determination is made by the billing system **60** through a lookup of a subscriber profile associated with the requesting subscriber, and an analysis as to whether the subscriber profile indicates that the subscriber has sufficient funds and the authority to receive the requested service item. This determination also requires that

10   the billing system **60** know the price of each service item the billing system **60** provisions.

After determining that the subscriber **75** is authorized to receive the requested service item the billing system **60** instructs the controller **65** to transmit a message to the STB **70** that authorizes the STB **70** to receive the service item. The billing system **60**

15   then prints a bill **55** that corresponds to the service item. It will be appreciated that the billing system **60** therefore is not only involved in billing for a service, but in fulfilling or provisioning the service item because the billing system **60** must instruct the controller **65** that the service item should be provided to a STB **70** associated with an authorized subscriber **75**. According to one illustrative example, if the subscriber **75** called up the

20   cable company and requested a PPV movie, a customer service representative would be operating a terminal running software provided by the billing system **60** that tells the network controller **65** to authorize the STB **70** to play the movie. The price of the movie, as maintained by the billing service **60**, is then added to the subscriber's bill **55**.

FIG. 3 shows a block diagram view of components comprising a cable system **100**

25   of the present invention, according to one embodiment of the invention. It should be appreciated that the systems and methods of the present invention are described below with reference to block diagrams and flowchart illustrations of systems, methods, apparatuses and computer program products according to embodiments of the invention. It will be understood that each block of the block diagrams and flowchart illustrations,

30   and combinations of blocks in the block diagrams and flowchart illustrations, respectively, can be implemented by computer program instructions. These computer

program instructions may be loaded onto a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions which execute on the computer or other programmable data processing apparatus create means for implementing the functions specified in the

5   flowchart block or blocks.

These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including instruction means that implement

10   the function specified in the flowchart block or blocks. The computer program instructions may also be loaded onto a computer or other programmable data processing apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer implemented process such that the instructions that execute on the computer or other programmable apparatus provide steps

15   for implementing the functions specified in the flowchart block or blocks.

Accordingly, blocks of the block diagrams and flowchart illustrations support combinations of means for performing the specified functions, combinations of steps for performing the specified functions and program instruction means for performing the specified functions. It will also be understood that each block of the block diagrams and

20   flowchart illustrations, and combinations of blocks in the block diagrams and flowchart illustrations, can be implemented by special purpose hardware-based computer systems that perform the specified functions or steps, or combinations of special purpose hardware and computer instructions.

According to the systems and methods of the present invention, the billing system

25   is only responsible for billing, rather than the provisioning, of services. This allows new services to be quickly added to cable systems without the time consuming and expensive task of configuring the billing system specifically for new services added to the system. Referring now to FIG. 3, components comprising a cable system **100** of the present invention are illustrated. The system **100** includes a billing system **110**, a service **115**, a

30   network controller **130**, a subscriber **140** and a STB **135**. The network controller **130**, STB **135** and subscriber **140** are identical in form and function to the network controller

65, STB **70** and subscriber **75** illustrated in FIG. 2. However, unlike the system of FIG. 2, where the billing system **60** provisions a service item, the service **115** is responsible for fulfilling a request for a particular service in the system **100** of FIG. 3. It should be appreciated that although only one service **115** is illustrated in FIG. 3, multiple services

5   may be included in the system **100**. Furthermore, although the service **115** of FIG. 3 is discussed herein with reference to an MOD service, it should be appreciated that this is a non-limiting example of any type of service that can be implemented in the system **100**.

Services may be located at one or more headends in the cable system **100**, and are associated with at least one application for implementing the service, as is discussed in

10   detail with respect to FIG. 4. Therefore, it should be appreciated that there are one or more applications installed in the headend, each of which is associated with one or more services. These applications work in conjunction with subscriber STBs to implement a requested service. Although the service **115** provisions services in the system **100** of FIG. 3, the billing system **110** still provides billing functions as will be described in detail

15   below. By splitting the provisioning function from the billing function the fulfilling of a service, such as authorizing video to be transmitted to a particular STB, systems and methods of the present invention allow new services to be implemented in the system **100** without requiring that an existing billing system **110** be altered to meet the demands of the new service. This results in faster implementation of new services in the network

20   **100**. Furthermore, existing system components, such as those illustrated in FIG. 2, do not need to be altered to effect the advantages of the present invention.

To divide the billing function of the billing system **110** from the provisioning function of the service **115**, the service **115** generates at least one offering **120**, which contains a price algorithm **125** and metadata **127**. The offering **120** is used by the system

25   **100** to provision and bill for a service item made available to the subscriber **140** from the service **115**. According to one aspect of the invention, offerings are created for each service item that is purchasable by a subscriber **140**. For instance, according to one illustrative embodiment of the invention the service **115** may be a Movie-On-Demand (MOD) service that is associated with an MOD application for provisioning the MOD

30   service to enable a subscriber-requested movie to be transmitted to and received at the subscriber's STB. Because a typical MOD service contains multiple movies that are

purchasable by a subscriber, the MOD service creates independent offerings associated with each movie. In this example each movie has a corresponding offering because the offering is utilized to implement the service and bill the subscriber for the particular movie purchased from the MOD service. And because each movie is associated with one offering, the offering can be used to create a line item entry on a subscriber bill that corresponds to the purchased movie.

According to one embodiment of the invention, the offering **120** is set up using extensible markup language (XML), though it will be appreciated by those of skill in the art that other methods of creating an offering can be used. Although only one offering is illustrated in FIG. 3, the service **115** can include multiple offerings, each of which include corresponding price algorithms and metadata. The price algorithm is utilized for computing the price of an offering for a particular customer, and the metadata is utilized by the billing system **110** to compute the actual price of an offering **120**.

Regardless of the particular type of service **115** implemented in the system **100**, each service **115** utilizes offerings **120** to represent an offer to sell a service, or some item of the service, to a subscriber **140**. Exactly what the offering represents will depend on the nature of the service **115** that defines the offering **120**. For instance, an offering may be a particular channel, stream, session or the like, of AOL television, PPV, MOD, interactive sports, or other well known services. Thus, the offering for an MOD service may be completely different than an offering that allows a subscriber to order a pizza over the Internet. Though the offerings vary according to the service **115** being implemented, the metadata **127** within the offering **120** appears the same to the billing system **110** regardless of the type of service. This allows metadata **127** to be utilized by the billing system **110** to compute the actual price of an offering **120** regardless of the type of offering **120** or service **115** implemented in the system **100**.

In generating an offering the service **115** requests a list of all metadata items that the billing system **110** can interpret. This allows the service **115** to create offerings having metadata **127** that is understood by the billing system **110**. The service **115** can retrieve this list of metadata items periodically, or the request can be executed by an operator or administrator of the service. An operator creating the offering **120** at the service **115** can therefore view the list of metadata and can generate the offering **120** to

include particular items in the offering metadata **127**. For instance, where a new interactive service is implemented in the system **100**, the service **115** may identify that the billing system **110** is capable of receiving metadata representing the price of an offering, the identity of the subscriber, taxes associated with the subscriber's locality, and

5 additional billing-related information well known to those of skill in the art. Thus, in creating the offering the service **115** will include in the metadata **127** price, identification, tax, and other fields that can be interpreted by the billing system **110**. Therefore, in constructing each offering **120** the service **115** ensures that the offering **120** includes sufficient metadata to enable the billing system **110** to bill the subscriber for the

10 appropriate amount for the offering **120**. In generating an offering the service not only communicates with the billing system **110** to ascertain the type and form of metadata understood by the billing system **110** such that the service **115** can generate an offering **120** containing generic billing-related metadata understood by the billing system, but also tax-related category information associated with the service **115**. Each offering **120** for a

15 particular service **115** is subject to a particular tax structure, which is included in the offering **120** metadata **127**.

Because the offering **120** includes particular metadata items, whenever a purchase of the offering **120** is recorded this information is transmitted to the billing system **110** so the billing system **110** can interpret how to generate a bill **105**, or a line item on a bill

20 **105**, for the service **115**. Furthermore, because the billing system **110** handles complex bill-related calculations, the generation of a bill **105**, and billing the subscriber, the service **115** must only concern itself with generating an offering **120** having the requisite price information corresponding to the particular offering. Because the service **115,** which is typically implemented by software developers, simply requests metadata

25 information with the billing system **110**, the service or developers of the service **115** need not know any details about the details of the billing system **110**. Likewise, the service **115** need not know any information regarding specialized pricing information such as taxes or franchise fees or the like associated with the provision or purchase of a service offering. Rather, each service **115** implemented in the system **100** must only include an

30 offering **120** that operations personnel can populate with particular information for a

service. Thus, there is no need for the developer of the service **115** to know anything about how billing is executed.

As noted above, the offering **120** includes metadata **127** and a price algorithm **125** More specifically, the metadata **127** is used by the billing system **110** to compute the

5   actual price and the price algorithm **125** is used to gather pricing data from one or more marketing components **129** to compute the list price shown to subscribers. This pricing data can include the price, discounts, marketing campaigns and promotions (collectively referred to herein as marketing data) associated with an offering **120**. Therefore, the metadata **127** does not include marketing data, which is contained within the price

10   algorithm **125**, as noted above. The marketing components **129** can be included within the service **115** (as illustrated) or separate from the service **115**, and provide the costs and/or discounts for particular offerings. According to one aspect of the invention, the marketing component **129** can comprise a cable company marketing department which generates the marketing data. According to another aspect of the invention, the

15   marketing component can comprise one or more applications running on servers established by a marketing department or similar marketing entity. For instance, a marketing component within an MOD service may offer subscribers a buy-one-get-on-free deal, in which two movies are offered for the price of one. It should be appreciated that the marketing component considered by the price algorithm **125** to generate

20   discounted prices differs from the billing system **110** in that the marketing component is utilized only to determine a list price which is offered to subscribers for a particular offering or set of offerings. Therefore, the price algorithm **125** computes a list price offered to subscribers, whereas the billing system **110** computes additional costs unrelated to the price offered to subscribers and the ultimate price that will appear on a

25   subscriber's **140** bill **105**. For instance, the billing system **110** computes add-on costs such as franchise fees, taxes, and the like, which are not typically presented to a subscriber at the time an offering **120** is presented for purchase.

When a subscriber **140** wishes to purchase the offering **120**, the price algorithm **125** is executed to determine the offering's list price based upon marketing data.

30   Thereafter a purchase order is sent to the billing system **110**, which examines the metadata **127**, and uses the metadata to compute add-ons to the offering price. According

to one aspect of the present invention, after the subscriber **140** requests a particular offering for delivery, the service **115** communicates with the controller **130** to request resources to fulfill the service **115**, and the billing system **110** is requested to bill for the service. The billing system **110** only receives a message indicating that the offering

5   should be placed on the subscriber's bill **105**, and need not know about what is involved in getting the service delivered to the subscriber.

When a purchase is made, it is only the billing portion of the offering that is provided to the billing system **110**. The billing system **110** is limited to computing add-on costs the subscriber does not see until receiving the bill **105**. For instance, continuing

10   with the illustrative example of an MOD service, where a subscriber orders an MOD, the MOD service or the marketing component **129** establishes a price of the service, which is provided to the price algorithm **125** to compute what a typical subscriber will pay for the offering, the list price of the offering. As is explained in reference to FIG. 4, this list price may further be changed depending upon the identity of a particular subscriber, such

15   that offering price may be tailored to individual subscribers. Also included within the offering **120** in the form of metadata **127** is the billing data that subjects the MOD to taxes, franchise fees, etc. The billing system **110** applies taxes, adds in franchise fees, and executes the processing required to generate financial statements provided on a subscriber's bill **105**. To accomplish this processing the billing system **110** may include

20   tax tables corresponding to different services. Therefore, a service may be taxable at a particular rate provided within a table stored by the billing system **110**.

It should be appreciated that multiple tax methods may be generated where tax rates and franchise fees are calculated for services, and thus, each offering **120** will refer to a particular tax method. More specifically, the metadata **127** points to a particular tax

25   method which the billing system **110** uses to compute taxes/fees. Knowledge of different types of tax structures is therefore retained in the billing system **110**. On the other hand, the service **115** retains information on which particular offerings **120** are associated with a particular tax method. Thus, the service **115** does not know anything about the tax structure itself. The billing system is limited to computing and adding on costs the

30   customer does not see until he receives the bill. According to one preferred embodiment of the invention, this requires that the billing system **110** set up tax structures and

franchise fees owed for various categories or types of services. For instance, broadcast services may be taxed at a first rate, and have a franchise fee, while interactive services may be taxed at another rate with a different franchise fee.

FIG. 4 shows a block diagram view of a cable system **150** of the present invention according to one aspect of the invention. The system **150** generally includes a billing system **155**, customer service representative (CSR) **160**, headend **190**, deal maker **215**, and STB **220**. The billing system **155** is similar to the billing system **110**. At least one server located at the headend **190** is running an Application-A (App-S) **195**, where App-S **195** implements a service, such as the service **115** of FIG. 3. Although FIG. 4 will be discussed with reference to a single App-S **195** being associated with only one service, there may be many applications like App-S **195** installed in the headend **190**, where each is associated with multiple services. As illustrated in FIG. 4, App-S **195** communicates with the STB **220**, and more specifically, with the Application-C (App-C) **225** within the STB **220**. App-S **195** and App-C **225** run in conjunction with each other to execute offerings and to implement a service on the STB **220**. Typically, App-C **225** and App-S **195** are one piece of software created as a unit, and are not required to be interoperable with other network services. A developer of App-S **195** and App-C **225** can utilize whatever protocol works on the HFC network, which can include the headend **190**. Facilities in the HFC network can be used to implement this communication, which can occur using Internet protocol, broadcast file system (BFS), pass-through messaging (part of the DSM-CC standard), a modem, or the like.

As an illustrative example, App-C **225** may be a Watch-TV application, which digitally tunes the STB **220** to a particular channel. If, for instance, in a particular cable system channel **500** corresponds to CNN, then App-C **225** running on the STB **220** provides the STB **220** a particular frequency and the required data fields that enables the STB **220** to tune to CNN when the subscriber selects channel **500**. In another illustrative example, App-C **225** may present a list of offerings (e.g., including offering **120** of FIG. 3) for purchase by a subscriber from a service. Preferably the offerings are presented to the subscriber via a graphical user interface (GUI), and selectable by the subscriber through the use of a remote control that allows the subscriber to navigate the GUI and select an offering. Alternatively the user may view the offerings that are presented on a

television set and utilize a telephone to purchase a particular offering. Regardless of the method used to display and accept an offering, once the subscriber has selected an offering, App-C **225** transmits a message to the App-S **195** identifying the offering purchased by a subscriber.

5   According to one embodiment of the present invention, every application includes a number of objects, or interfaces, for executing one or more services and for facilitating the billing of the subscriber for usage of the services. As shown in FIG. 4, App-S **195** includes an application object **200**, service object **200** and offering object **210**. The application object **200** is that part of the application that must be exported by the App-S

10   **195** to run the application on the STB **220**. The service object **205** is the application plus one or more parameters that define the particular service implemented by the App-S **195**. For instance, where Watch-TV represents the App-S **195**, CNN may be a service implemented by the Watch TV service. Different parameters provided to Watch-TV, on the other hand, may result in an HBO service. Therefore, for each App-S there may be

15   many services definable by the service object **204**. Last, the offering object **210**, also referred to herein as the offering, defines the particular service item offered to a subscriber for purchase. For instance, the offering object **210** may comprise a particular movie purchasable by a subscriber from a MOD service.

After an offering is transmitted to the STB **220** and selected for purchase by a

20   subscriber, a buy request is transmitted from the STB **220** to the App-S **195**. Upon receipt of the buy request from the STB **220**, the App-S **195** will first determine the identity of the STB **220** that submitted the buy request. The identity of the STB **220** is determined by examining the MAC address of the STB **220**, which is transmitted to the App-S **195** with the buy request. MAC addresses, as are well known in the art, are unique addresses

25   associated with each STB **220**. Because the App-S **195** does not maintain a database of STB MAC addresses, or the subscribers associated with MAC addresses, the App-S **195** transmits a subscriber identification request to the one or more network components that maintain such information. The subscriber profile associated with the STB **220** MAC address is retrieved, and identifies the subscriber whose account will be responsible for

30   paying for the offering **210**. Because the request may originate from a home having multiple residents, it will be appreciated that the subscriber identified will typically be the

resident responsible for paying for the cable service. However, it will also be appreciated by those of skill in the art that each resident may have one or more codes, passwords or IDs that may be required to be input along with the buy request, such that a particular person associated with that request can be identified and billed.

5   Upon receiving the subscriber identity from the equipment object, the App-S **195** can create a purchase, which is a link between an offering and a subscriber identifying what is being purchased, and by which subscriber. The App-S **195** then calculates the offering price, utilizing the price algorithm contained within the offering **210** and marketing data provided by the marketing components and, according to one aspect of

10   the invention, the deal maker **215**.

       Because the offering price takes into account both the offering **210** and the subscriber purchasing the offering **210**, this is the first point at which the offering price can be determined for the particular subscriber making the purchase. For instance, although an offering **210** may be associated with a particular price set up by the service

15   generating the offering **210** and available to typical subscribers regardless of subscriber identity, a particular subscriber profile may result a better price of the offering **210**, such as where a special marketing event occurs for a class that includes the subscriber. Additionally, a subscriber's service record may be considered to determine in the subscriber is eligible to receive discounts. For instance, because a subscriber may

20   purchase many MODs, the subscriber may become eligible for a special rate for a MOD. Additionally, as noted above with respect to FIG. 3, a marketing server may also identify discounts to all subscribers regardless of their identity. As noted above, the offering price may include data provided by the deal maker **215**. The deal maker **215** is a rules engine for determining discounts for subscribers based on the subscriber's purchase history and

25   the services offered in the system. According to one aspect of the invention, the deal maker **215** is an application implemented by a server that may be separate from the one or more marketing applications **129** illustrated in FIG. 3, as the deal maker **215** can include rules that apply across multiple services rather than specific to one service being implemented. The offering **210** can communicate with the deal maker **215** to request

30   deal data associated with a particular offering.

Thus, after the offering price is calculated, taking into account any special offers or discounts provided by the deal maker **215**, an eligibility check is made to determine if the subscriber has sufficient funds or credit to receive the purchased offering. To make this determination the APP-S **195** requests a credit check from the billing system **155**,

5 which will determine whether the subscriber has credit to receive the offering. The billing system will then acknowledge that the subscriber has sufficient credit, or indicate that the subscriber should not be able to purchase the selected offering. This may utilize a CSR **160** in communication with the billing system **155**. If the subscriber is authorized to receive the service offering, the App-S **195** will then provision the offering **210**.

10 According to one aspect of the invention that the price of an offering may be calculated based upon a price per unit. For instance, where the subscriber orders a MOD, each movie may correspond to one unit. In this embodiment, only after the price per unit is transmitted to the APP-S **195** will the App-S **195** respond with the number of units requested by the subscriber. According to one aspect of the invention this occurs after

15 the credit check request is made to the billing system. Finally, the units established by the App-S **195** may be multiplied by the unit price and forwarded to the billing system **155** for inclusion on a subscriber bill. This allows the system **150** to bill for services that may be based upon time, such as Internet service. Thus, when a subscriber logs onto the Internet a unit price may be calculated, such as a price per minute. Not until after the

20 subscriber completes accessing the Internet will the number of minutes the subscriber accessed the Internet be identified so that a line item can be created and forwarded to the billing system **155**. This allows a service to be billed on a usage basis.

According to the systems and methods of the present invention, the billing system is only responsible for billing, rather than the provisioning, of services. This allows new

25 services to be quickly added to cable systems without the time consuming and expensive task of configuring the billing system specifically for new services added to the system.

Many modifications and other embodiments of the invention will come to mind to one skilled in the art to which this invention pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be

30 understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the

scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.